PSYCHE.

NOTES ON THE HABITS OF TRYPOXYLLON RUBROCINCTUM AND TRYPOXYLLON ALBOPILOSUM.

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When we went out to our summer cottage, in the last days of June, we found many little wasps of the species *Trypoxyllon rubrocinctum* busily working about a brick smoke-house on the place. Closer examination showed that in the mortar between the bricks were many little openings leading back for a considerable distance, which were occupied by the wasps. It would seem that these holes were excavated by some other agency than the wasps themselves as they were so much too deep for their purposes that before using them they built a mud partition across the opening about an inch from the outside of the wall. Later on we found nests of the same species in the posts which support an upper balcony of the cottage, and here, too, the wasps made use of holes which were already excavated. We also found in these posts nests of *Trypoxyllon albopilosum* and during July and August we kept a close watch upon the comings and going of our little neighbors.

They were very good-tempered little creatures, never resenting our close proximity nor our interference with their housekeeping. By working hard they could prepare a nest, store it with spiders and seal it up, all in the same day. This we have seen them do in several instances. In other cases the same operation takes three or four days.

With both species, when the preliminary work of cleaning the nest and erecting the inner partition has been performed by the female, the male takes up his station inside the cell facing outward, his little head just filling the opening. Here he stands on guard for the greater part of the time until the nest is provisioned and sealed up, occasionally varying the monotony of his task by a short flight. As a usual thing all of the work is performed by the female, who applies herself to her duties with greater or with less industry according to her individual character; but the male doubtless performs an important office in protecting the nest from parasites. We have frequently seen him drive away the brilliant green *Chrysis* fly which is always waiting about for a chance to enter an unguarded nest. On these occasions the defence is carried on with great vigor, the fly being pursued for some distance

into the air. There are usually two or three unmated males flying about in the neighborhood of the nests, poking their heads into unused holes, and occasionally trying to enter one that is occupied, but never so far as we have seen, with any success, the male in charge being always quite ready and able to take care of his rights. The males, however, never made any objection when strange females entered the nest as they sometimes did by mistake, nor did the females object to the entrance of a strange male when the one belonging to the nest happened to be away, but in such cases the rightful owner, on his return, quickly ejected the intruder. We often amused ourselves, while we were watching the nests, by approaching the little male, as he stood in his doorway, with a blade of grass. He always attacked it valiantly, and sometimes grasped it so tightly in his mandibles that he could be drawn out of the nest with it.

When the female returns to the nest with a spider the male flies out to make way for her, and then as she goes in he alights on her back and enters with her. When she comes out again she brings him with her, but he at once re-enters, and then, after a moment, comes out and backs in, so that he faces outward as before.

In one instance, with *rubrocinctum*, where the work of storing the nest had been delayed by rainy weather, we saw the male assisting by taking the spiders from the female as she brought them and packing them into the nest leaving her free to hunt for more. This was an especially attentive little fellow, as he guarded the nest almost continuously for four days, the female sometimes being gone for hours at a time. On the last day he even revisited the nest three or four times after it had been sealed up.

It is upon the female that the heaviest part of the work devolves. As soon as she has put the nest in order she begins the arduous task of catching spiders wherewith to store it. It usually takes them from ten to twenty minutes to find a spider and bring it home, but they are sometimes absent for a much longer time. When the spider has been carried to the nest the process of packing it in begins. This occupies some time and, apparently, a good deal of strength, the female pushing it into place with her head with a total disregard of its comfort, all the spiders that are caught being pressed and jammed together into a compact mass. While she is busied in this way she makes a loud cheerful humming noise like that made by the blue and yellow mud-daubers, as, standing on their heads, they gather their loads of mud. The number of spiders brought seems to depend upon their size, in which quality they vary greatly, the largest ones being six or eight times as large as the smallest. *Rubrocinctum* fills her nest with from seven to twelve, while the larger *albopilosum* brings as many as twenty-five or thirty. Those that we examined represented many different genera, and even different families, although they were usually Epeiridae.

In a number of cases, after several spiders had been stored, we gently drew them out with a bent wire. In one nest in which there were five spiders, we found, two hours after they had been stored, that three were alive and two were dead. In another which the wasp had just begun to seal up were ten spiders. Three of these were injured in being drawn out. Of the remainder four were alive and three dead. On the anterior part of the dorsum of one of the living spiders was the egg. It had probably been fertilized as the female carried the male into the nest on her back.

When a female returns with her load she usually hunts about for a few moments before finding her nest, often entering two or three that are empty or are occupied by other wasps by mistake, so that it would seem that their sense of locality is not very strongly developed.

After the storing process is completed the female seals up the nest with mud. In the case of one *rubrocinctum* that we were watching she began to close the opening at 4.43 P.M. and finished her work just thirty minutes later. In this time she made ten journeys for mud bringing it in pellets in her mandibles. In another case, also a *rubrocinctum*, the female, after bringing so many spiders that the cell was full up to the very door (which we saw in no other case), went away without closing it and never returned. The male seemed uneasy at her conduct and several times flew away, staying an hour or two and then returning; but after a time he too deserted the nest. Whether some evil fate overtook the female or whether there was some failure of instinct on her part can only be conjectured, but the latter hypothesis is not untenable, since out of twenty-six nests that we had under observation three were cleaned out and prepared and were then sealed up empty. We have often found similar cases among the nests of the blue mud-dauber wasps where it is not a very uncommon thing for the absent-minded females to build their pretty little cylindrical nests with infinite care and patience and then to seal them up without putting anything inside.

One afternoon as we sat, literally, at our posts, a female of *albopilosum* came humming along looking very important and energetic, as though she had planned beforehand exactly what to do. She entered an empty hole, head first, and at once began to gnaw at the wood, kicking it out backwards with considerable violence. After a few minutes she changed her method of work, and began to carry out loads of wood dust in her mandibles, dropping it in little showers just outside the nest, and then hastening back. In forty minutes she carried out, in this way, upwards of fifty loads. She then flew away, but returned in ten minutes with a male. She alighted, he took his place on her back and they went in together.

After a time they came out and both flew away, but the next morning they came back and the nest was stored.

In this species (*albopilosum*) the male does not always come out of the nest when the female brings a spider. Perhaps the nest is enough larger than in *rubrocinctum* to accommodate them both comfortably. As a usual thing, however, he enters on the back of the female. The spiders brought by *albopilosum* are larger than those used by *rubrocinctum*. They sometimes bring such heavy specimens of *Epeira insularis* that they are carried with difficulty, the wasp alighting and dragging the spider into the hole instead of flying directly in, as usual.

Mr. W. H. Ashmead has noted that *albopilosum* stores its nest with aphides but in the cases that we observed they used only spiders. There can be no mistake on this point as we more than once took the spider from the wasp as she was entering the nest. In a recent letter Mr. Ashmead says that his notes were made in the field, and that it was probably a case of mistaken identity on his part.

We sometimes found the parasitic Melittobia fly in the nests of *rubrocinctum*, and from two nests we reared the common fly *Pachyophthalmus aurifrons*.

We do not know how many nests are stored by the female in one season, nor the length of time taken in the development of the young. Two nests, sealed up on June 30 and July 1 are at the present time, August 31, still unopened.

The interest of the wasps in family affairs seems to flag in the second week of August and we saw no new nests started after the fifteenth, so that it is probable that after that time the hard working little creatures enjoy a well earned holiday on the blossoms of the aster and the golden rod.

We are under many obligations to Mr. W. H. Ashmead for his kindness in naming for us both the wasps and their parasites. His name is a sufficient guarantee for the correctness of the identification.

THE LARVA OF HARRISINA CORACINA CLEMENS.

BY HARRISON G. DYAR, NEW YORK, N. Y.

Mr. T. D. A. Cockerell has sent me larvae of a Harrisina found on *Vitis vinifera* at Las Cruces, New Mexico. Mr. Cockerell takes the moth of *H. coracina* commonly on the same vines, and also a few *H. metallica*; but he does not think that these are the larvae of the latter, as they are so much more rare. With this conclusion I agree, as the larvae differ too much from our *H. americana* to be those of the closely allied *H. metallica*.

Larva. Shaped as *H. americana*, thick, flattened, the head retractile. Yellow; cervical shield, warts on joint 2, a band on joint 3 covering the three upper warts and the two lower ones also black; a band on joint 4 and on 5 to wart vi; a band on joints 6, 8, 10, 11 and 12 to the spiracle and the anal plate black, including the short hairs. Purple patches extend between the bands on joints 5 and 6, running forward to cover the lateral area of joint 4 to the band on that